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EXAMINER	
WONG, LESLIE	

ART UNIT	PAPER NUMBER
2177	16

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/747,515	ARNING ET AL.	
	Examiner	Art Unit	
	Leslie Wong	2177	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *55-87* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *55-87* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Receipt of Applicant's Amendment, filed 08 January 2004, is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 55-59, 61-65, and 67-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chen et al.** (U.S. Patent 5,727,199) in view of **Agrawal et al.** (U.S Patent 5,647,058).

Regarding claims 55, 61, and 67, **Chen et al.** teaches a method, an apparatus and an article of manufacture of accessing a subject multi-dimensional database stored on a data store connected to a computer, comprising:

a). receiving an indication of a number of features of said subject multi-dimensional database to be identified (col. 3, lines 56-61 and col. 4, lines 30-34);

b). performing feature identification to identify the indicated number of features (col. 4, line 60 – col. 7, line 30); and

c). **Chen t al.** does not clearly teach a step of creating an index for the subject multi-dimensional database using the identified number of features.

Agrawal et al., however, teaches high dimensional indexing by taking N-dimensional data vectors and builds an index of k-dimensional points (col. 4, lines 6-30).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to create an index for the subject multi-dimensional database using the identified number of features in order to accurately retrieve desired information quickly and effectively.

Regarding claims 56, 62, and 68, **Agrawal et al.** further teaches a step wherein creating the index comprises creating a multi-dimensional database that is derived from the subject multi-dimensional database (col. 4, lines 6-9).

Regarding claims 57, 63, and 69, **Chen et al.** further teaches wherein receiving the number of features to be identified comprises receiving a parameter value (col. 3, lines 54-61).

Regarding claims 58, 64, and 70, **Agrawal et al.** further teaches a step wherein feature identification comprises generating an ordered list of multi-dimensional points (col. 5, lines 38-41).

Regarding claims 59, 65, and 71, **Agrawal et al.** further teaches a step wherein further comprising creating the index using the list of multi-dimensional points (col. 4, lines 6-10).

4. Claims 60, 66, and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chen et al.** (U.S. Patent 5,727,199) in view of **Agrawal et al.** (U.S Patent 5,647,058) as applied to claims 55-59, 61-65, and 67-71 and in further view of **Agrawal et al.[2]** (U.S. Patent 6,094,651).

Regarding claims 60, 66, and 72, **Chen et al.** and **Agrawal et al.**, do not teach a step wherein the index stores deviation values for each of the identified number of features.

However, **Agrawal et al.[2]** teaches a step for locating data anomalies in a K dimensional data cube (Fig. 6; col. 2, line 38 - col. 3, line 10).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the feature of exploring the performance data for finding regions of anomalies in the data as taught by **Agrawal et al.[2]** in order to identify problem areas and/or new opportunities (col. 1, lines 34-36).

5. Claims are 73-76, 78-81, and 83-86 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chen et al.** (U.S. Patent 5,727,199) in view of **Agrawal et al.** (U.S Patent 5,647,058), and further in view of **Information Builders Inc**. (Information Builders ready with Fusion multi-dimensional database for warehousing, executive information systems).

Regarding claims 73, 78, and 83, **Chen t al.** teaches a method of accessing a subject multi-dimensional database stored on a data store connected to a computer, comprising:

a). receiving an indication of a number of features of said subject multi-dimensional database to be identified (col. 3, lines 56-61 and col. 4, lines 30-34);

b). performing feature identification to identify the indicated number of features (col. 4, line 60 – col. 7, line 30); and

c). **Chen et al.** does not clearly teach a step of creating an index for the subject multi-dimensional database using the identified number of features, wherein the index comprises a second multi-dimensional database that is derived from the subject multi-dimensional database.

Agrawal et al., however, teaches high dimensional indexing by taking N-dimensional data vectors and builds an index of k-dimensional points (col. 4, lines 6-30; col. 5, lines 38-41).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to create an index for the subject multi-dimensional database using the identified number of features in order to accurately retrieve desired information quickly and effectively.

Chen et al. and **Agrawal et al.**, do not explicitly teach wherein the index comprises a second multi-dimensional database that is derived from the subject multi-dimensional database.

Information Builders Inc., however, teaches wherein the index comprises a second index multi-dimensional database (¶ 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to store the index for the subject multi-dimensional database separately because doing so would facilitate updating of multi-dimensional data and increase the system performance.

Regarding claims 74, 79, and 84, **Chen et al.** further teaches wherein receiving the number of features to be identified comprises receiving a parameter value (col. 3, lines 54-61).

Regarding claims 75, 80, and 85, **Chen et al.** further teaches wherein performing feature identification comprises generating an ordered list of multi-dimensional points (col. 5, lines 38-41).

Regarding claims 76, 81, and 86, **Chen et al.** further teaches wherein further comprising creating the index using the list of multidimensional points (col. 4, lines 6-10).

6. Claims 77, 82, and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chen et al.** (U.S. Patent 5,727,199) in view of **Agrawal et al.** (U.S Patent 5,647,058) and **Information Builders Inc**. (Information Builders ready with

Fusion multi-dimensional database for warehousing, executive information systems) as applied to claims 73-76, 78-81, and 83-86 and in further view of **Agrawal et al.[2]** (U.S. Patent 6,094,651).

Regarding claims 77, 82, and 87, **Chen et al., Agrawal et al.**, and **Information Builders Inc**. do not teach a step wherein the index stores deviation values for each of the identified number of features.

However, **Agrawal et al.[2]** teaches a step for locating data anomalies in a K dimensional data cube (Fig. 6; col. 2, line 38 - col. 3, line 10).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the feature of exploring the performance data for finding regions of anomalies in the data as taught by **Agrawal et al.[2]** in order to identify problem areas and/or new opportunities (col. 1, lines 34-36; col. 2, lines 20-26 and 38-43).

Response to Argument

7. Applicant's arguments filed 08 January 2004 have been fully considered but they are not persuasive.

Applicants argue that Chen does not teach the claimed limitations as suggested by the Examiner. The Applicants construct a table for a side-by-side comparison between independent claim 55 against Examiner's cited portions of Chen patent in

attempt to show that there is no correspondence between the claimed limitations and the applied prior art. Further, Applicants allege that there is no limitation with regard to an indication of the number of the features to be identified.

In response to the preceding arguments, Examiner respectfully submits that claimed limitation recites: **"Receiving an indication of a number of features of said subject multi-dimensional database to be identified".** Chen teaches a system for database mining which improves the operations of multi-feature extraction and efficiently develops classification rules from a large training database (col. 2, lines 24-30). Chen further teaches that one may want to know what features e.g., ages, salary ranges, genders, and zip codes, of a customer, indicate the type of car he is likely to own (col. 3, lines 50-51; lines 58-61). The recited portion implies that the user must enter the desired feature via an interface; thereby provides the system an indication of the desired features to be mined. Based on user's feature indication, Chen's system identifies the specified features and processes it accordingly (col. 3, lines 56-61). As pointed out on page 10 of Applicants' Response, the present invention provides a user interface to set up definitions for the subject muti-dimensional to be mined, dimensions to be mined, and measure to be mined (i.e., feature identification). Chen teaches feature identification for data mining as recited above. Hence, Chen teaches the limitation as claimed.

Further, Applicants argue that Examiner cites the Agrawal[1] patent as teaching high-dimensional indexing by taking N-dimensional data vectors and building an index of k-dimensional points. This is not relevant to the present application as the application describes an index having the same dimensions as the subject database.

In response to the preceding arguments, Examiner respectfully submits that Agrawal[1] teaches high-dimensional indexing by taking N-dimensional data vectors and building an index of k-dimensional points, where *k is less than or equal to N* (col. 5, lines 38-41). Thus, Agrawal[1] can be used to construct the multi-dimensional index with the same dimensions as the subject database.

Further, Applicants allege that Agrawal[1] patent is directed toward a multimedia database storing images, audio, and video components. Combining the Agrawal[1] patent with the Chen patent would not provide features as claimed.

In response to the preceding arguments, Examiner respectfully submits that Agrawal[1] teaches high-dimensional (i.e., multi-dimensional) indexing in a multi-media database. Agrawal[1] further teaches that feature extraction techniques are known in the arts especially in database image storage. In order for an object to be retrieved (i.e., extract), the object may be characterized by its *features* such as color, texture, and shape of an image (col. 2, lines 17-28). Agrawal[1] teaches feature extraction and

multi-dimensional indexing. Therefore, combining Agrawal[1]'s teaching with Chen's would arrive at Applicants' limitation as claimed.

Further, Applicants argue that merely separating an index from the data in a multi-dimensional database does not make the index itself into a multi-dimensional database and that there is no teaching or suggestion in Agrawal[1] that the index is a multi-dimensional database.

In response to the preceding arguments, Examiner respectfully submits that Agrawal[1] teaches high-dimensional indexing by taking N-dimensional data vectors and building an index of k-dimensional points, where *k is less than or equal to N* (col. 5, lines 38-41). Agrawal[1] does not separate an index from the data in a multi-dimensional database as alleged by the Applicants. On the contrary, Agrawal[1] derives the k-dimensional (i.e., multi-dimensional) index from the N-dimensional data vectors as the Applicants derive the multi-dimensional index from the multi-dimensional subject database.

Further, Applicants argue the index taught in the Agrawal[1] is not a multi-dimensional database. Rather, the index mechanism taught in the Agrawal[1] is simply a point access method (PAM), such as an R-tree index. Additionally, Applicants argue that although the PAM index of the Agrawal[1] may index data having any number of dimensions, the index itself is not a multi-dimensional database.

In response to the preceding arguments, Examiner respectfully submits that, for the sake of argument, let pretend that Agrawal[1]'s index is an R-tree index, R-tree possesses all the properties and meets the requirements of multidimensional indexes. Thus, R-tree can be used to create multi-dimensional indexing for a multi-dimensional database. One skilled in the art would have been motivated to employ multidimensional indexes because of it ability to perform spatial queries, similarity queries, and multi-dimensional range queries. Hence, multiple indexes may be created and stored in a database for a given set of data items which yields the multi-dimensional index database.

Last, Applicants argue that Agrawal[2] teaches locating of anomalies bears no resemblance to the deviations described in the present application (page 14, line 10 – page 17, line 6).

In response to the preceding arguments, Examiner respectfully submits that Applicants cited pages 14 to 17 of the Specification does not contain a clear definition of the term *deviations*. The cited portions of text in the Specification merely display a table consists of rank, year, product, market, and deviation dimensions and the values associated with those dimensions. For the deviation dimension, the values are 0.06, 0.03, and 0.02 for ranks 1 to 3, respectively. Examiner could not locate any explanations as to what those values may represent and how they related to other

values in other dimensions. Further, the cited portions of text in the Specification describe a spreadsheet that capture and reflect the index data. Since the Specification does not provide a clear definition for the term deviation, Examiner interprets from its ordinary meaning: "Deviant behavior or attitudes or divergence from an accepted policy". In this case, Agrawal[2] teaches a discovery-driven approach for data exploration of a data cube where a search for anomalies is guided to interesting areas of the data by pre-minded paths that are based on *exceptions found at various levels* of data aggregation. Consequently, Agrawal[2] ensures that *abnormal* data patterns are not missed at any level of data aggregation (col. 2, lines 20-26). Further, Agrawal[2] teaches locating data anomalies in a k dimensional data cube that includes the steps of associating a surprise value with each cell of a data cube, and indicating a data *anomaly (i.e., deviations)* when the surprise value associated with a cell exceeds a predetermined exception threshold (col. 2, lines 38-43). Hence, Agrawal[2] teaches the limitation as claimed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leslie Wong whose telephone number is (703) 305-3018. The examiner can normally be reached on Monday to Friday 9:30am - 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Breene can be reached on (703) 305-9790. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Leslie Wong
Patent Examiner
Art Unit 2177

LW
31 March 2004

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PRIMARY EXAMINER